Restoration of Oak Island sandscape at Apostle Islands National Lakeshore

By Julie Van Stappen

TWENTY-ONE ISLANDS and a strip of mainland set in a matrix of Lake Superior comprise Apostle Islands National Lakeshore in northwestern Wisconsin. The lakeshore is well-known for its diverse, sandy coastal features, known as sandscapes. They include sandspits, cuspate forelands (sandspits that are wider than they are long), tombolos (sandbars that connect two islands or an island and the mainland), a barrier spit, and numerous beaches, which are among the highest quality of any in the Great Lakes region. Sandscapes are very popular visitor-use areas and are among the few places available for boats to access the islands. However, vegetation on sandscapes is very sensitive to trampling.

Park resource managers have been monitoring the lakeshore's 17 significant sandscapes since 1988. Among those monitored is a 1.6-acre (0.7-ha) cuspate foreland on Oak Island that has a long history of human use. Monitoring results over a 10-year period showed that Oak Island housed the most threatened sandscape and required restoration.

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Since 2000, park natural resource staff has been working with the Natural Resource Conservation Service's (NRCS) Plant Materials Center in Rose Lake, Michigan, to restore Oak Island's sandscape. Scientists from the NRCS center gathered native plant materials from the site and began propagating 15 species. In 2001 they set up 18 plots for determining appropriate lighting conditions to establish propagated plants, and also collected additional plant materials for restoration. Park maintenance staff assisted with restoration by installing floating boardwalks, which have been very effective in directing visitors and minimizing their impacts on sandscapes.

In late May 2002 the majority of the on-site restoration occurred: a Northland College field ecology class planted 3,200 propagated plants, with NRCS and park staffs providing technical assistance. Follow-up monitoring included establishing 20 plots in 10 of the more heavily planted areas. In addition, park staff set up plots for determining the effectiveness of pulling vs. treating orange hawkweed (*Hieracium aurantiacum*), the most abundant exotic species on the sandscape.

Results of the experimental plots from 2001 showed that plants did equally well in sunny and partially shady conditions. Plants under shady conditions did the best. Plants such as horsetail-like equisetum (*Equisetum arvense*) did extremely well the first year, tapering off during the second year. Plant counts of blueberry (*Vaccinium angustifolium*), rose (*Rosa blanda*), and Pennsylvania sedge (*Carex pensylvanica*) steadily increased with time; common juniper (*Juniperus communis* L.) had a fairly low survival rate (44%) after the first year, but once established did very well.

This cuspate foreland on Oak Island in Apostle Islands National Lakeshore is one of many coastal features comprising the park's 17 significant sandscapes. These lakefront areas are popular with visitors, but are also fragile, easily trampled ecosystems.

Park managers were very encouraged by the results from the 2002 plots: from July 2002 to September 2003, nonnative species decreased from 66% to 41% of the plant count, clearly indicating native species outcompeting nonnative ones. Changes in areal coverage revealed decreases in bare ground and nonnative species and increases in vegetative litter and native species. Results at the plots of orange hawkweed showed that pulling was more effective than chemical treatment.

This restoration effort was challenging. Visitor trampling had removed the thin layer of organic matter that normally provides some protection from extreme conditions, resulting in pure sand, a very harsh environment for new plants. Watering after planting was not feasible because of the difficulty in getting to the site. The only way to get personnel, plants, and supplies to the restoration area was by boat across Lake Superior, and planting needed to be done in spring when storms are frequent. In addition, high visitor use and impacts from deer browsing resulted in less improvement of certain areas after planting.

Lessons learned from the 2003 monitoring results will be applied during restoration efforts in 2004. First, plants propagated from local plant material established successfully and were effective in increasing native plant populations. Second, having a fairly large number of people do the initial plantings was extremely helpful, minimizing the length of time between receiving plants and getting them into the ground. Third, peat pots caused problems by popping up with changing moisture conditions, and the perlite, which is mixed with soil, may have attracted deer. ■

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